Citizen Science projects and partnerships in academia

MEGAN CARLTON, MLIS

SCIENCE LIBRARIAN

UNC GREENSBORO

Zoom Poll

What is citizen science?

Scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions (Oxford English Dictionary).

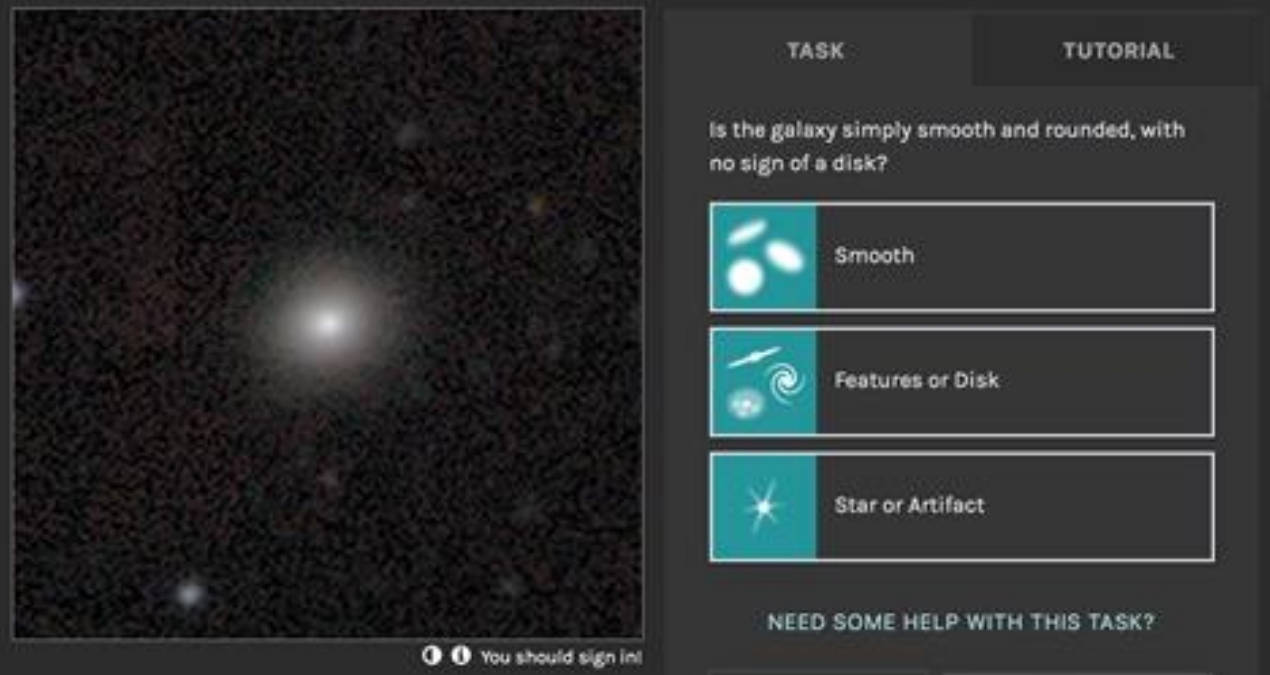
What is citizen science?

Public participation in scientific research

SDSS

Sloan Digital Sky Survey

GALAXY ZOO



2007 – Oxford graduate student

Spent 1 month classifying galaxies for 12 hours/day = 50,000

Launched Galaxy Zoo

70,000 classifications/hour the first days

50 million the first year

Klesman, A. (2018, Sept 26). Zonniverse: A citizen science success story. Astronomy.

A very brief

History of Citizen Science

Lighthouse keepers collect data about bird strikes for scientists

National Audubon Society starts annual Christmas Bird Count

Public Participation in Ornithology (Cornell Lab)

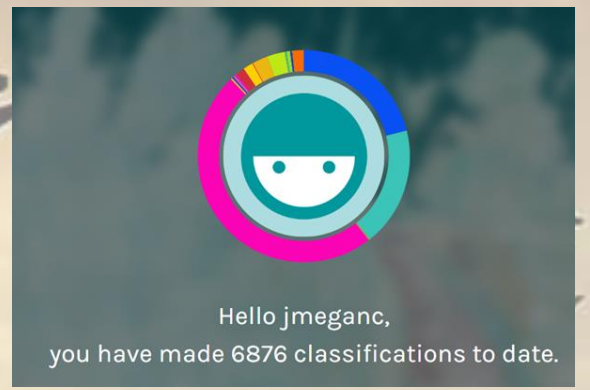
National Weather Service Cooperative Observer Program begins

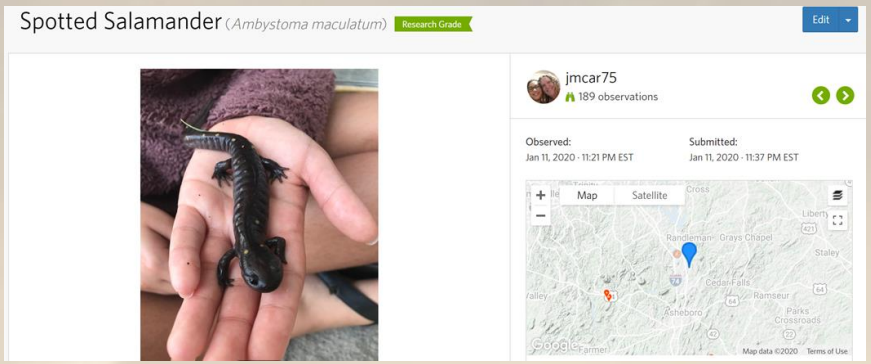
NSF's Public Understanding of Science Program

Bonney, R., et al. 2009. Public Participation in Scientific Research: Defining the Field and Assessing Its Potential for Informal Science Education. A CAISE Inquiry Group Report. Washington, D.C.: Center for Advancement of Informal Science Education (CAISE).

A very brief

History of…me





Zooniverse → EcoExplore → BoxTurtles → iNaturalist

eco EXPLORE

THE BOX TURTLE CONNECTION

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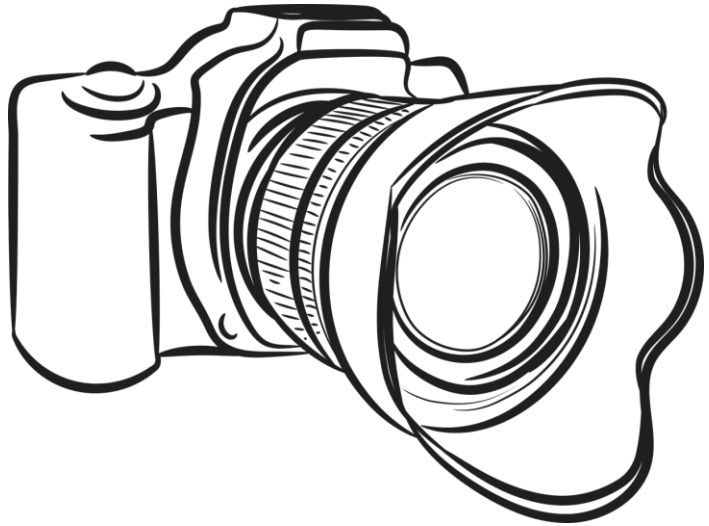


How can we use this in academia?

Concerns that faculty may have:

UNDERSTANDING THE BENEFITS FOR STUDENTS OF USING CITIZEN SCIENCE PROJECTS.

DETAILS ABOUT HOW TO INTEGRATE PROJECTS INTO CLASSES OR RESEARCH.

CONCERNS ABOUT ACCURACY.

Communicating the benefits for students:

- K-12 benefits widely recognized
- Inquiry based learning important for undergraduates too!
- Promotes engagement with the **process** of science
- encourages students to:
  - pose questions,
  - generate and analyze data,
  - draw conclusions,
  - communicate findings.

Oberhauser and LeBuhn, 2012

More benefits for students:

- Involves undergraduates in:
  - Project design
  - Data collection and management
  - Independent research

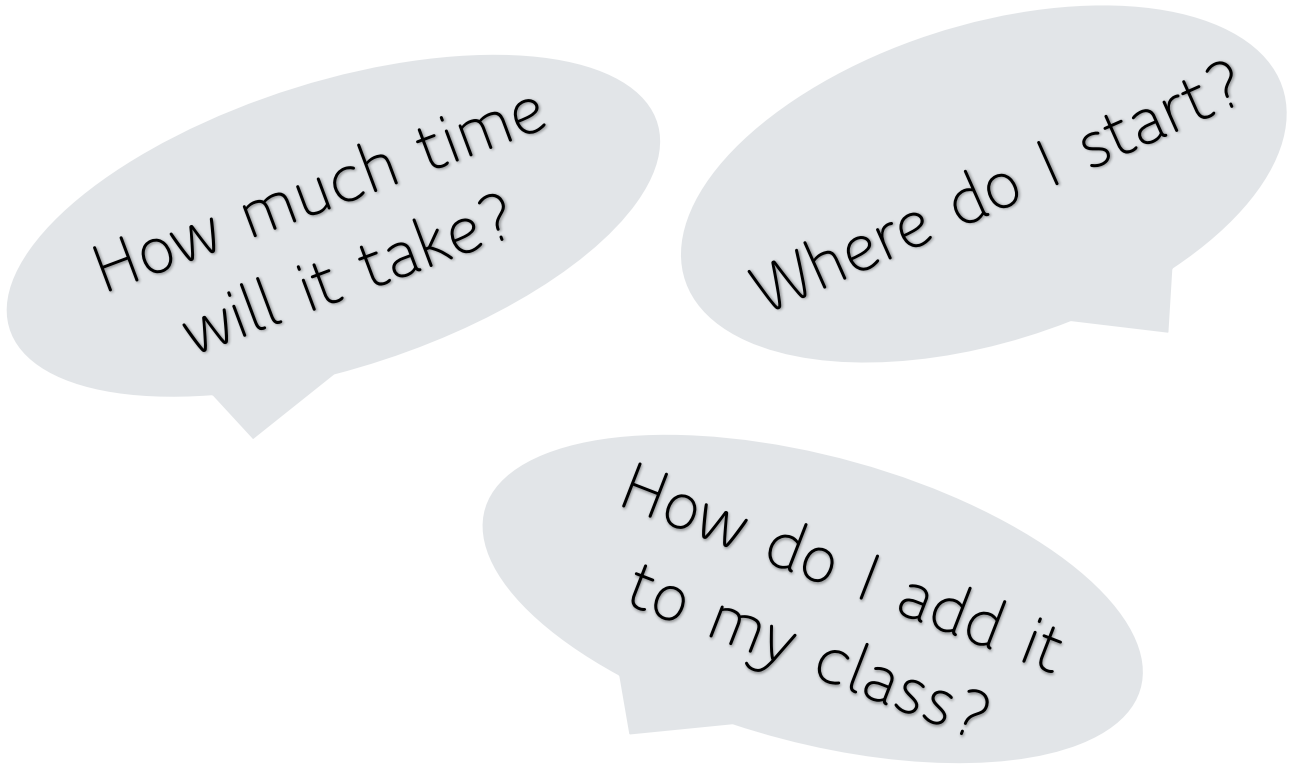
Enhances undergraduate education through inquiry-based learning!

Oberhauser and LeBuhn, 2012

- Engages nonmajor science students
- Institutions with limited resources
- Promotes science-literacy
- Inspires diverse students to pursue science careers especially among women, first-generation, and non-white students.

Kridelbaugh, 2016

Integrating projects into courses:



After initial conversations with faculty:

- Be familiar with projects and where to find them.
- Send an example!
- Can the project be scaled up or down?
- Other ideas?

The Use of Online Citizen-Science Projects to Provide Experiential Learning Opportunities for Nonmajor Science Students

Defined a list of projects students could choose from.

- Used SciStarter to select relevant projects

Students spent 3 hours selected project

- Recorded notes
- Took screenshots

Culminated in project report

- Required background research
- Evaluated project

(Kridelbaugh, 2016)

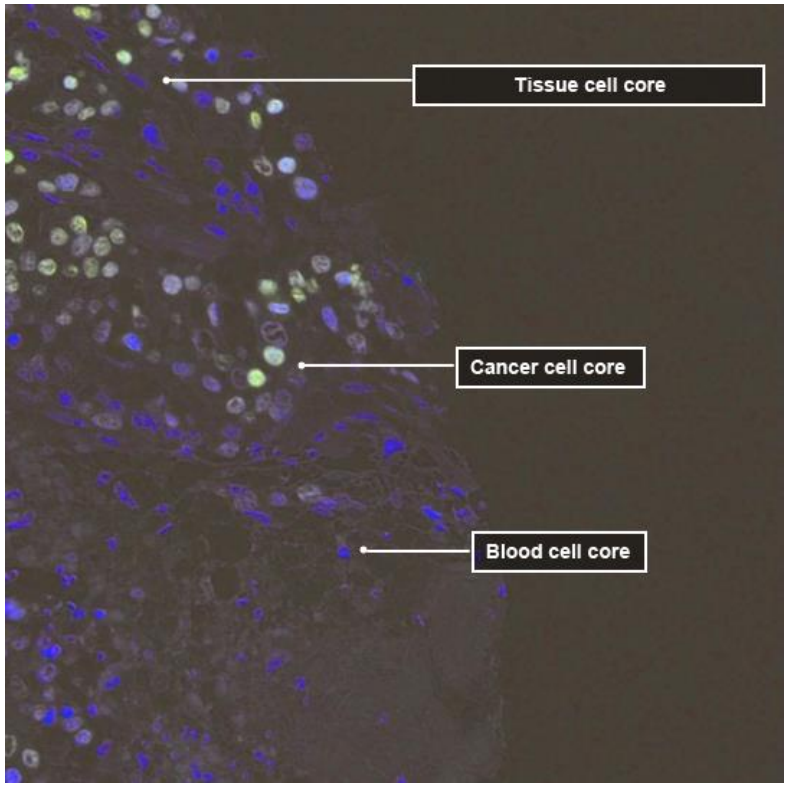


Image from Zooniverse project cellslider.net tutorial

CITIZEN SCIENCE PROJECT (100 points)

Objectives: Understand that everyone can be a scientist; learn to be creative and innovative in designing solutions to health and science challenges; practice writing a science report.

- Pick one online citizen science project from the list of acceptable projects.
- Spend at least three hours of time participating in the project and take notes.
- Submit a final report by the due date to include the following information:
    - Project notes (25 points)
    - Screen shot (or print screen as .pdf file) of the project in progress (25 points)
    - Mini-report (3-4 pages) with the following components (50 points):
        1. Provide an **Introduction** and **background** information about the project*
        2. State the **problem** that is being investigated with the project
        3. Describe the **method** on how citizen scientists are helping to solve the problem
        4. Describe the **results** of what you specifically contributed to the project
        5. Discuss the expected **outcomes** of the project

*Use at least two reliable resources (besides the project website) in your report and cite the references in a works cited list at the end of the paper. Also, number your reference section and place a number in parentheses in text where you used an idea from a reference. Please see the "Reference Format" file on the classroom website for guidelines on formatting your references section.

List of Projects*:

Name of Project	Instructions	Website
Cell Slider	Create account and sort through images to identify cancer cells.	http://www.cellslider.net/#/
Flip the Clinic	Provide feedback on a posted flip and submit one flip idea.	http://fliptheclinic.org

(Kridelbaugh, 2016)

Camera-trap Technology

- Can greatly expand geographic study area
- Noninvasive
- Easy to operate
- Reduces field time commitments
- No trapping/immobilizing training needed
- Produces a large amount of data…

Karlin and De La Paz, 2015

Accuracy of citizen science data:

Snapshot Serengeti project

From June 2010 to May 2013

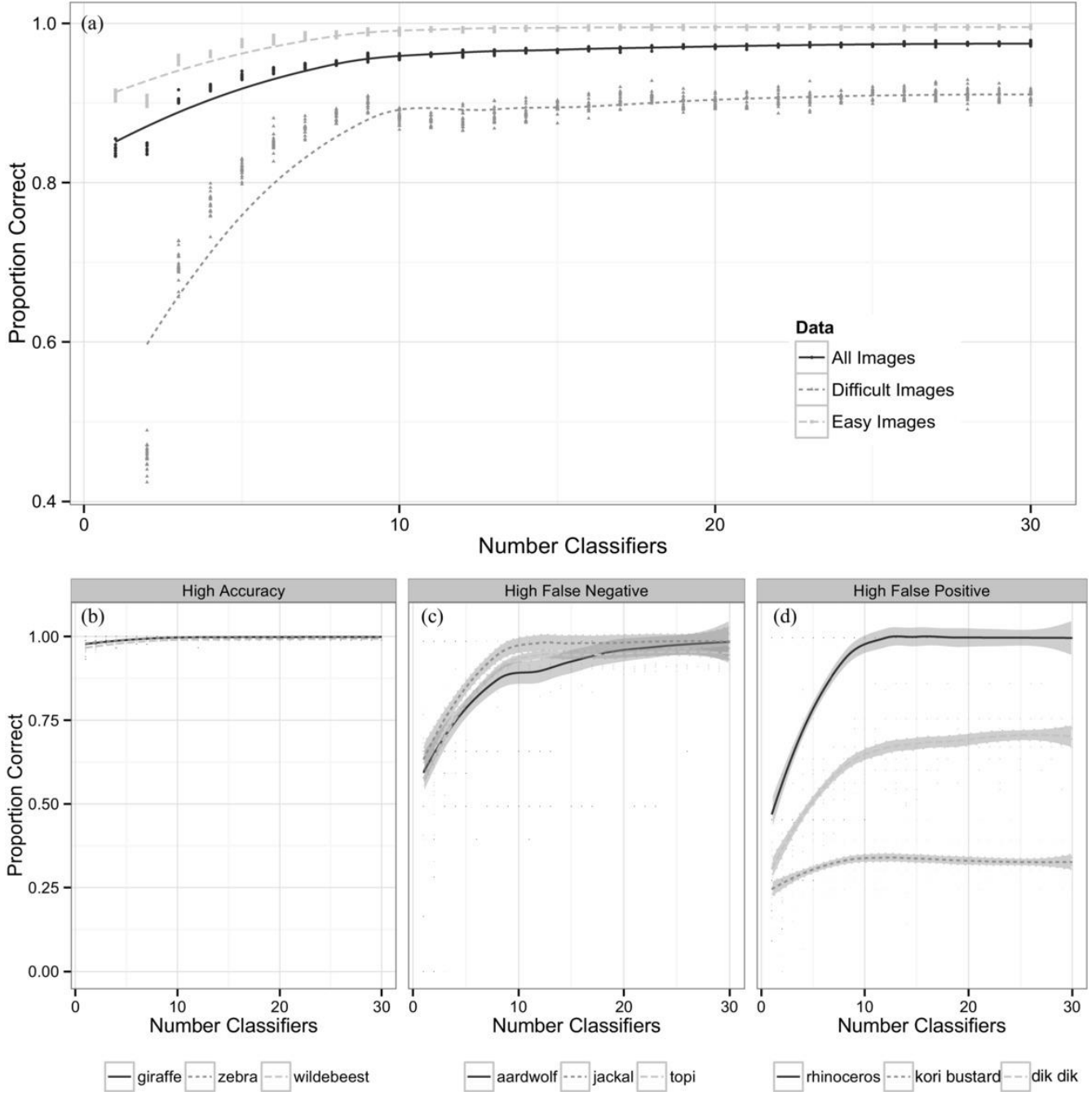
Produced 1.2 million image sets (each image set contained 1–3 images taken in a single burst over approximately 1 s)

Within 3 d of launching the website, volunteers contributed 1 million species classifications and processed an 18-month backlog of images

Swanson et al, 2016

Accuracy of citizen science data:

- In Snapshot Serengeti, images achieved approximately:
  - 90% accuracy at 5 classifiers,
  - 95% accuracy at 10 classifiers,
  - approached 98% accuracy after 20 classifiers



Swanson et al, 2016

Discussion

What concerns do you think faculty have about using projects in their classroom?

In their research?

Are there any projects that could have been used during the transition to virtual labs (during COVID-19)?

Citizen Science Resources

iNaturalist https://inaturalist.org/

SciStarter https://scistarter.org/

Zooniverse https://www.zooniverse.org/

CitizenScience.gov https://www.citizenscience.gov/

eBird -The Cornell Lab of Ornithology https://www.ebird.org

EPA and other federal resources https://www.epa.gov/citizen-science/resources-citizen-science-projects

Arizona State University Citizen Science LibGuide https://libguides.asu.edu/citizenscience

References

Karlin, M., & De La Paz, G. (2015). Using Camera-Trap Technology to Improve Undergraduate Education and Citizen Science Contributions in Wildlife Research. *The Southwestern Naturalist, 60*(2), 171-179. https://search.proquest.com/docview/1778690402?accountid=14604

Kridelbaugh DM. The Use of Online Citizen-Science Projects to Provide Experiential Learning Opportunities for Nonmajor Science Students. *Journal of Microbiology & Biology Education,* 2016 Mar;17(1):105-106. DOI: 10.1128/jmbe.v17i1.1022.

Oberhauser, K. and LeBuhn, G. (2012), Insects and Plants: Engaging undergraduates in Authentic Research Through Citizen Science. *Frontiers in Ecology and the Environment,* 10: 318-320. doi:10.1890/110274

Swanson, A., Kosmala, M., Lintott, C. and Packer, C. (2016), A generalized approach for producing, quantifying, and validating citizen science data from wildlife images. *Conservation Biology,* 30: 520-531. doi:10.1111/cobi.12695

If you are here early…

http://go.uncg.edu/snapshot